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(54) METHOD FOR PERFORMING MULTIPLY-ADD OPERATIONS ON PACKED DATA

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(56) References Cited

U.S. PATENT DOCUMENTS

3,711,692 A	1/1973	Batcher	708/210
3,723,715 A	3/1973	Chen et al	708/709

(List continued on next page.)

OTHER PUBLICATIONS

J. Shipnes, *Graphics Processing with the 88110 RISC Micro*processor, IEEE (1992), pp. 169–174.

MC88110 Second Generation RISC Microprocessor User's Manual, Motorola Inc. (1991).

Errata to MC88110 Second Generation RISC Microprocessor User's Manual, Motorola Inc. (1992), pp. 1–11.

MC88110 Programmer's Reference Guide, Motorola Inc. (1992), p. 1–4.

i860[™] Microprocessor Family Programmer's Reference Manual, Intel Corporation (1992), Ch. 1, 3, 8, 12.

R. B. Lee, Accelerating Multimedia With Enhanced Microprocessors, IEEE Micro (Apr. 1995), pp 22–32.

TMS320C2x User's Guide, Texas Instruments (1993) pp 3–2 through 3–11; 3–28 through 3–34; 4–1 through 4–22; 4–41;4–103;4–119 through 4–120;4–122; 4–150 through 4–151.

L. Gwennap, New PA-RISC Processor Decodes MPEG Video, Microprocessor Report (Jan. 1994), pp 16, 17.

SPARC Technology Business, *UltraSPARC Multimedia* Capabilities On–Chip Support for Real–Time Video Advanced Graphics, Sun Microsystems (Sep. 1994).

(List continued on next page.)

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(57) ABSTRACT

A method and apparatus for including in a processor instructions for performing multiply-add operations on packed data. In one embodiment, a processor is coupled to a memory. The memory has stored therein a first packed data and a second packed data. The processor performs operations on data elements in said first packed data and said second packed data to generate a third packed data in response to receiving an instruction. At least two of the data elements in this third packed data storing the result of performing multiply-add operations on data elements in the first and second packed data.

14 Claims, 7 Drawing Sheets

